

expressed themselves in no uncertain terms to the effect that, for general meteorological purposes, the reduction to standard gravity is imperative, and that it should be uniformly adopted by all national services and not later than January 1, 1901. In fact, the Polar Conference had already urged this step in 1884 as imperative even at that time, and the Chief Signal Officer, General Hazen, acting promptly upon this request, introduced this correction with the monthly constants for January, 1885, and continued it, in connection with Ferrel's reduction to sea level, on August 1, 1886; but, on January 1, 1888, this improvement was abandoned in order to await the general action of all national services. The recent extension of the service of the Weather Bureau so that our daily weather maps now comprehend the region from latitude  $10^{\circ}$  to  $55^{\circ}$  north, brings the importance of the gravity question into great prominence, and by recent instructions, No. 92, dated October 19, the correction will be applied to all mercurial barometers of the Weather Bureau on and after January 1, 1899. The correction will be applied at the same time with those for temperature and other instrumental errors, thus giving first the correct pressure in standard inches of mercury for the locality of the barometer. This local pressure is then reduced to sea level or to any other desired altitude, and the new pressures thus obtained will also be expressed in terms of the recognized international standards.

## INSTRUCTIONS No. 92, 1898.

Owing to the recent extensions of the Weather Bureau in the West Indies and along the South American coast, the whole territory now reporting barometric pressures embraces a wide range of latitude, and the barometric readings corrected for temperature and instrumental error only, at the extremes, are widely discordant, owing to variations in the force of gravity with latitude. Therefore, on and after January 1, 1899, the appropriate correction for gravity will be applied to all barometric readings. This correction is nearly constant at any one station, and is given in Table II, page 66 of Circular F, Instrument Room. The gravity correction to be used at a station will be incorporated with the correction for instrumental error and capillarity, and a correction card giving the appropriate correction for each instrument will be furnished by the Instrument Division.

The following example will elucidate the complete correction of the barometric reading:

Attached thermometer $76.5^{\circ}$ ; observed barometer reading.....	30.287
Correction for temperature.....	-0.131
Correction for gravity, instrumental error, and capillarity.....	-0.066
Total correction.....	-0.197
Corrected reading.....	30.090

The total correction, ascertained as shown above, will be entered on Form No. 1001—Met'l in the column in which the correction for temperature has been recorded heretofore. Observers may find it convenient to compute a small station table, by combining once for all the gravity and instrumental error corrections with those for temperature, thus giving the total correction for the ordinary temperatures and pressure that prevail at their stations. A new table must be prepared, however, whenever a new correction for instrumental error is employed.

The corrected reading, derived as above, is a standard measure of atmospheric pressure, and is perfectly comparable with similarly corrected readings made at any place the world over.

It takes a long time to overcome the conservatism of the practical world. Men are so accustomed to think in the terms taught them in childhood that even after they have long since perceived that those terms have acquired a new significance and ought to be expressed by new words, or new standards, they still hold on to the old ones.

They may know that the barometer is affected by the temperature of its scale and its mercury, and that both the atmospheric pressure and the weight of the column of mercury depend upon the downward pull of the force of gravity, but they may be slow to take the trouble to make the necessary corrections and allowances. Exact meteorology is now

engaged in studying the atmosphere as a whole and demands that atmospheric pressure should be everywhere measured by the same standard and not by one that varies with the temperature or the latitude. There was a time when every city and country could have its own standard foot, pound, and bushel, but this confusion is now largely abolished in commercial matters and must, also, be abolished in science. We must measure pressure in some uniform standard unit, such as the weight of a pound of mercury, or the height of a column of mercury, under standard gravity. The pressure, per square inch, that will hold up fifteen pounds of mercury under the standard gravity that prevails under  $45^{\circ}$  of latitude and sea level, will not hold up so much mercury when the attraction of gravitation upon the mercury increases, as it does do as we go northward toward the pole. The reduction to standard gravity is simply an effort to convert our measurements of atmospheric pressure into one common unit so that they will be strictly comparable among themselves all over the world.

## THE PRACTICAL SIDE OF WEATHER BUREAU WORK.

The observers in charge of Weather Bureau stations are expected to be, not merely faithful observers and studious meteorologists, but also eminently practical men. That is to say, they must know when, where, and how to apply their knowledge to the best interests of the community around them, and that community consists not merely of the citizens of the city or town in which the station is located, but also includes all the country tributary thereto. We have not yet learned that any other government weather bureau has called upon the merchants or citizens to form local meteorological committees to advise with the local observers as to their mutual interests; but this is always done by the United States Weather Bureau, and has been one of the most important means of securing the appreciative support of the people. We are led to these remarks by a paragraph in the recent annual report of the Chamber of Commerce of Chattanooga, commenting upon the work of our observer in charge, Mr. Lewis M. Pindell. Of course, this report is but one of hundreds that are made from time to time by every local committee on meteorology. If similar committees were established in other countries, their respective weather services would, perhaps, profit thereby as the United States Weather Bureau has done.

## THE WEATHER BUREAU AND THE LIBRARIES.

Although the publications of the Climate and Crop sections are widely distributed in their respective States, yet it has always been difficult to secure sets of them for preservation in libraries outside of the States. In order to remedy this difficulty, the Chief of the Weather Bureau has directed that complete sets of all the monthly reports of sections be deposited with the larger libraries of the United States, and the special meteorological libraries of foreign countries. The list thus far agreed upon is as follows:

- The Library of Congress, Washington, D. C.
- The Free Public Library, San Francisco, Cal.
- The Public Library, Chicago, Ill.
- The Public Library, Boston, Mass.
- The Public Library, St. Louis, Mo.
- The Astor Branch of the Public Library, New York, N. Y.
- The Meteorological Office, Toronto, Canada.
- The K. P. Met. Institut, 6 Schinkelplatz, Berlin, W.
- The Deutsche Seewarte, Hamburg, Germany.
- The Centralanstalt f. Met., Vienna, Austria.
- The Central Physical Observatory, St. Petersburg, Russia.